

Can the MSLT be a Useful Tool to Assess Motor Vehicle Crash Risk in Sleepy Drivers?

Commentary on Drake et al. The 10-year risk of verified motor vehicle crashes in relation to physiologic sleepiness. *SLEEP* 2010;33:745-752.

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OVER THE LAST 15 YEARS, EPIDEMIOLOGICAL STUDIES HAVE HIGHLIGHTED THE PREVALENCE OF SLEEPINESS AND SLEEP DISORDERS AMONG THE GENERAL population.¹⁻³ Sleepiness at the wheel^{2,4} has been identified as one of the major reasons for highway accidents and fatal crashes and patients suffering from excessive daytime sleepiness have a higher chance of traffic accidents than non sleepy drivers.⁵⁻⁹ These findings have raised questions for clinicians who treat patients that rely on driving on a daily basis. Is a simple questionnaire sufficient to estimate the risk of accidents in sleepy patients, or could an objective test provide a better estimate regarding accident risk?

Intuitively, questionnaires may not be the optimal tools when evaluating the actual level of sleepiness at the wheel, especially in professional drivers. Indeed, workers may under report their level of sleepiness at the wheel particularly if they can lose their jobs because of this symptom. In that case an objective measure of sleepiness, if not falsifiable, should be more reliable.

In this issue of *SLEEP*, Drake and colleagues¹⁰ report the results of a study in which they compared an objective measure of sleepiness and the risk of traffic accidents documented by Department of Motor Vehicles (DMV) records. This study is very pertinent in the legal context of medical fitness to drive. To do so, the authors chose the multiple sleep latency test (MSLT) as an objective measure of sleepiness. One can question why choose the MSLT instead of the maintenance of wakefulness test (MWT), which is also feasible for most sleep centers. Both the MSLT and the MWT are useful clinical objective tests for the evaluation of excessive daytime sleepiness, but it is arguable whether they measure the same dimensions in terms of excessive daytime somnolence. The MSLT is a validated objective measure of the ability or tendency to fall asleep. The MSLT is intended to measure physiological sleep tendency under standardized conditions in the absence of external alerting factors. The test is based on the premise that the degree of sleepiness is reflected by sleep latency. The MSLT is considered the de facto standard for objective measure of sleepiness.¹¹

The MWT is a validated objective measure of the ability to stay awake for a defined period of time. Clinical relevance of the MWT is based on the premise that the volitional ability to remain awake provides important information regarding the ability to stay awake and respond to clinical interventions for disorders associated with excessive sleepiness.¹¹ As indicated by the task force of the American Academy of Sleep Medicine (AASM),¹¹ the MSLT is intended to measure physiological sleep tendency in an appropriate environment. The MWT, which requires patients to fight against sleepiness in a sleep conducive environment, is better adapted to evaluate the potential risk of sleepiness at the wheel.¹² It is regrettable that Drake et al.¹⁰ did not also include an MWT in their study which, a priori, should give an even better predictive value of motor vehicle crash risk.

Indeed, several studies have reported the correlation between MSLT and MWT results and simulated or real driving performance.¹³⁻¹⁶ In experimental conditions, impaired daytime alertness causes an increase in lateral deviations on the road during simulated¹⁷⁻²² and real life²³⁻²⁷ driving. Banks et al.²⁸ evaluated MWT with performance on a driving simulator in healthy sleep deprived volunteers. We have shown that among untreated people with sleep apnea, abnormal reduction of sleep latency at MWT (between 0 and 19 minutes) correlated with impaired driving in a car simulator²⁹ as well as real driving performance.¹⁶ Pizza et al.¹⁵ compared the relationship between performance on a driving simulator task with both MSLT and MWT scores. They concluded that the MWT scores were better correlates of driving performance than the MSLT.¹⁵

In line with these findings, on December 28, 2005, France released guidelines to regulate the processing and dispensing of driving licences of patients suffering from daytime sleepiness. Regarding professional drivers, treatment efficacy needs to be evaluated with a 40-minute MWT. This test has been selected because it reflects the ability to stay awake and is hardly falsifiable.

Although the MWT was not used in the report by Drake and colleagues,¹⁰ it is worth noting that they found very sleepy subjects on the MSLT had significantly higher risk of accidents over a 10-year period than did less sleepy drivers. Interestingly, the relationship between sleepiness and the risk of accidents exists independently of the severity of the accident. This finding eliminates the risk of recording only subjects who became sleepy after the accident because of a traumatic brain injury. Another interesting finding of their study is the very low proportion of subjects suffering from sleep disorders in the sleepy group of drivers. Data from the Wisconsin Sleep Cohort³⁰ showed a posi-

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tive correlation between MSLT scores and driving accidents in male drivers with OSAS. The results of Drake et al.¹⁰ do not contradict the findings of the Wisconsin Sleep Cohort³⁰ because the population samples are very different.

Both experimental and epidemiological findings confirm the fact that an objective measure of sleepiness predicts the risk of traffic accidents. But strangely enough there is as yet no study that uses with DMV reports when evaluating the impact of alerting drugs on motor vehicle crash risk. It is important to design prospective studies of crash outcomes to evaluate the risk before and after treatment of sleepiness in relationship to the level of improvement of alertness. Such findings will further strengthen the importance of using MSLT or MWT scores to evaluate fitness to drive in treated patients.

DISCLOSURE STATEMENT

Dr. Philip has participated in a speaking engagement for UCB and produced a report for Sanofi-Aventis on sleepiness at the wheel.

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